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# Application of alternative casing material for pulse neutron logging apparatus to improve the quality of the recorded signal

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## Abstract

© SGEM2018. The paper focuses on the results of mathematical modeling aimed to prove the possibility of application aluminum casing for Pulse Neutron Logging (PNL) tool. The simulation was carried out by the Monte Carlo method. A number of time decays for aluminum and steel cased PNL apparatus were calculated for carbonate rocks with different porosity. The model is represented by a rock with a 216 mm diameter well. 146 mm diameter steel column is cased in the well and has filled with fresh water inside. The PNL device is located along the well. Mathematical models of a pulsed neutron logging tool with an aluminum case were created. The obtained results showed the possibility of a significant increase in the count of the detected neutrons. The application of aluminum alloy made it possible to increase the total number of registered neutrons to + 80% and neutrons related to the well component to + 90%. The interesting fact that the increase of the useful signal on the far detector (60 cm) is within 75-77 percent and does not change much with the porosity change. This study showed the principal possibility of using an aluminum alloy as a PNL instrument case and it can be applied to devices that are already in use.

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## Keywords

Casing material, Monte-Carlo method modeling, Pulsed neutron logging

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